

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problems Mailbox.**



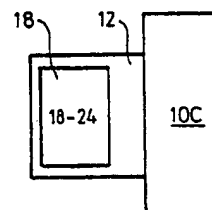
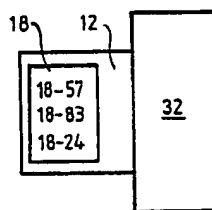
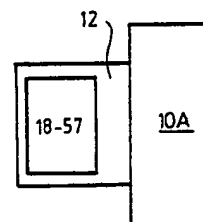
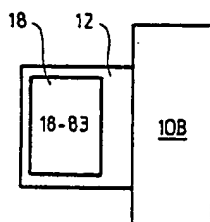
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : G06F 13/40	A1	(11) International Publication Number: WO 90/13872 (43) International Publication Date: 15 November 1990 (15.11.90)
(21) International Application Number: PCT/GB90/00653 (22) International Filing Date: 26 April 1990 (26.04.90) (30) Priority data: 8909850.3 28 April 1989 (28.04.89) GB 8909852.9 28 April 1989 (28.04.89) GB (71) Applicant (for all designated States except US): PA CONSULTING SERVICES LIMITED [GB/GB]; Hyde Park House, 60a Knightsbridge, London SW1X 7LE (GB). (72) Inventors; and (75) Inventors/Applicants (for US only) : ADES, Stephen [GB/GB]; 58 Ditton Walk, Cambridge CB5 8QE (GB). VINCENT, Geoffrey, Paul, Francis [GB/GB]; 2 Sidney Gardens, Haslingfield, Cambridge CB3 7NA (GB).		(74) Agents: NASH, Keith, Wilfrid et al.; Keith W Nash & Co., Pearl Assurance House, 90-92 Regent Street, Cambridge CB2 1DP (GB). (81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), US. Published <i>With international search report.</i>

(54) Title: COMPUTER CONNECTORS**(57) Abstract**

Method and apparatus is described for inter-connecting a plurality of computers (10) and peripheral units (32) using radio transceiver devices (12) incorporated into the separate units to establish radio links therebetween wherein each transceiver device incorporates a processor and a configuration memory (18) and an identification information is stored in each memory so that only units having appropriate identifiers can communicate with one another. In systems where only one peripheral (32) is to be accessed by two or more computers (10), the configuration memory (18) of the printer (32) may incorporate

all of the identifiers of the computers which are entitled to communicate therewith and the latter are continually monitored to determine whether a data highway is to be established between any one of them and the printer. The peripheral unit (32) may incorporate multiple radio receiver channels and a memory means to store data thus allowing more than one radio link to be established at the same time, the peripheral unit operating by sequentially accessing the data stored in the memory means of its own inter-connecting unit. The radio transceivers are conveniently incorporated within plugs adapted to be fitted into interface ports fitted as standard to computers and computer peripheral units.



DESIGNATIONS OF "DE"

Until further notice, any designation of "DE" in any international application whose international filing date is prior to October 3, 1990, shall have effect in the territory of the Federal Republic of Germany with the exception of the territory of the former German Democratic Republic.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	ES	Spain	MC	Monaco
AU	Australia	FI	Finland	MG	Madagascar
BB	Barbados	FR	France	ML	Mali
BE	Belgium	GA	Gabon	MR	Mauritania
BF	Burkina Faso	GB	United Kingdom	MW	Malawi
BG	Bulgaria	GR	Greece	NL	Netherlands
BJ	Benin	HU	Hungary	NO	Norway
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	SD	Sudan
CF	Central African Republic	KP	Democratic People's Republic of Korea	SE	Sweden
CG	Congo	KR	Republic of Korea	SN	Senegal
CH	Switzerland	LJ	Liechtenstein	SU	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
DE	Germany, Federal Republic of	LU	Luxembourg	TC	Togo
DK	Denmark			US	United States of America

- 1 -

Title Computer ConnectorsField of the invention

This invention relates to a method of and device for effecting an inter-connection between computers and other items of equipment which operate in conjunction with the computers. These other items of equipment may, for example, be constituted by printers, plotters, modems, computer-controlled machines or further computers. Such other items of equipment are for convenience and without limitation referred to hereinafter as peripheral units.

Background to the invention

Most personal computers, have one or more general interface ports for enabling inter-connection of the computer with one or more peripheral units.

The interface port is generally used to inter-connect the computer with a peripheral unit such as a printer, plotter or the like, as hereinbefore mentioned, which may be relatively close by or may be elsewhere in the premises where the computer is installed. Conventionally, the computer and the peripheral unit, which is equipped with one or more interface ports in like manner to the computer, are inter-connected through a connector lead, consisting of two connector plugs, e.g. two Canon-D fittings, joined by a length of connecting cable.

It has been proposed in a copending Patent Application

- 2 -

that a method of and device for inter-connecting a computer and a peripheral unit each equipped with interface ports, provides for inter-connection by means of two connector plugs for the respective interface ports, each plug being incorporated in a housing which also accommodates a short range radio transceiver, for transmitting signals to and receiving signals from the other to provide a data highway therebetween.

The method outlined is readily realisable in practice using current short range radio transceiver technology, which can be accommodated in a housing only slightly larger than the conventional casing of a Canon-D type connector fitting. One existing kind of short range radio transceiver system which is suitable is known as CT2, which is defined in British Standard BS6833. This is basically a voice transmission system which allows for up to forty pairs of transceivers each to have point-to-point inter-connection within a 100 metres diameter zone, each inter-connection using a separate frequency channel. When a transceiver is required to initiate a radio link to another transceiver, it searches for an unused frequency channel, claims the channel (assuming one to be available), starts up a point-to-point data transmission, and releases the channel when a link is no longer required.

Commonly, a premises may have a plurality of computers and a plurality of peripheral units to be inter-connected in pairs. In this case, it is important that the two units of a pair should be able to communicate with one another, possibly exclusively, and in any case it is necessary for the radio links to be set up between correct pairs of units.

- 3 -

The principal reason for this is that otherwise the radio links do not behave as expected by users regarding them as straight-forward replacements for conventional non-interacting connector leads. A second reason is that users of a particular radio link may have authenticated themselves as having particular privileges, and interception of data being transferred on that particular radio link by a third unit having a radio-equipped inter-connecting device could give rise to a security risk.

It is one objective of the present invention to provide a selective interconnection system whereby pairs of personal computers and peripheral units can be interconnected, exclusively if desired, without the need for hard wiring therebetween.

Additionally many users of personal computer systems require to use a peripheral unit such as a printer associated with the computer for only limited periods and it is often advantageous, from the point of view of expense, to provide only a single printer which can be used by a plurality of computers. Selective connection between the printer and any one computer may be manual or automatic, or simply by the operator plugging a connector lead from the relevant computer into the printer, and it is a supplementary objective of the invention to allow for selective interconnection of one peripheral unit and two or more personal computers without the need for hard wiring between any of the units involved, but only if such interconnection has previously be authorised.

- 4 -

Summary of the invention

According to one aspect of the present invention, there is provided a method of setting up a plurality of computers and peripheral units each having an interface port for receiving a radio transceiver equipped device for inter-connecting one unit (computer or peripheral unit) with another unit (computer or peripheral unit) by a radio link, according to which each inter-connecting device incorporates a processor and a configuration memory and an identifier is stored into the memory of each inter-connecting device so that only units having the same identifier can communicate with one another.

According to another aspect of the invention, there is provided a plurality of units consisting of computers and peripheral units each having an interface port and a radio-equipped device for inter-connecting one unit with another by radio link, wherein each inter-connecting device has a processor and a configuration memory in which is stored an identifier which will permit a unit having the said inter-connecting device plugged in to communicate only with a unit into which is plugged an inter-connecting device having the same identifier stored in its configuration memory.

The configuration memory of an inter-connecting device may be set up by plugging the inter-connecting device into the interface port of a computer and running a special configuration program on the computer to enter the identifier into the configuration memory of the device.

During running of the program, the operator may be asked

- 5 -

to enter an identifier, ie serial number, which may be a new number not already allocated on the premises, or alternatively, in another case, the program may automatically generate such a number not already allocated.

The basic requirement will be for inter-connection of units in pairs, e.g. one computer and one printer, and in this case only pairs with the same identifier will be able to exchange data. Inter-action between a radio transmission and a unit which is a member of another pair, is thus positively excluded.

The identifier may consist of two parts, namely the serial number unique to a pair of inter-connection devices followed by a randomly generated number. The storage of the second part, i.e. the random part, of the composite number provides security, as a person seeking to intercept data being transferred between a valid pair of inter-connecting devices will require to know not only the serial number, but also the randomly generated number. Assuming the random number is not retained in the computer once it has been stored in the memories of both inter-connection devices, security is provided at the level of a so-called "one time pad", in the terminology of security.

It will be understood that many computers have more than one general interface port, so that more than one inter-connecting device may be plugged into the unit.

It will also be understood that, in the case of an inter-connecting device for a printer or analogous peripheral unit, the identifier is programmed into the unit at a computer and after programming the device is removed from

- 6 -

the computer and transferred to the peripheral unit in question.

In this connection, it will be understood that the identifier is transferred from the computer to the inter-connecting device using a sequence of data, commonly referred to as an "escape sequence", not normally transferred by radio to another inter-connecting device, and being a sequence of data which an interface input/output circuit in the inter-connecting device is adapted to recognise as an instruction to the processor in the device to set up or alter the contents of the configuration memory.

Other data to be installed in the configuration memory of the inter-connecting device may be separately programmed in or be incorporated into the same computer program used to install the identifier.

For example, whilst the speed (bit rate) of a serial interface port may be set up by a speed recogniser in the interface input/output circuit, it may alternatively be set up by the computer program, and additionally this program may offer the option to allow or disallow speed recognition by the interface input/output circuit of the device.

According to a further aspect of the present invention, there is provided a method of setting up a computer system comprising plural units of a first type and a single unit of a second type, each unit having a radio transceiver equipped device for inter-connecting any first type unit with the second type unit by radio link. Each inter-connecting device may incorporate a processor and a

- 7 -

configuration memory and different identifiers are stored in the memories of the respective inter-connecting devices for the first type units whilst a record of these identifiers is stored in the memory of the second type unit.

Advantageously the second type unit, when not already radio linked, may continually monitor the first type units for a claimant for inter-connection, whereup a radio link with the claimant is established if a claimant is found, data is transferred on the established radio link, and the radio link is broken when transmission of data has ceased for a predetermined time-out period.

Alternatively, the inter-connecting device of the second type unit may incorporate multiple radio receiver channels and a memory means available to store data, thus allowing more than one radio link to be established at the same time, the second type unit operating by sequentially accessing the data stored in the memory means of its inter-connecting unit.

According to a still further aspect of the invention, there is provided a computer system having plural units of a first type and a single unit of a second type, each unit having a radio-equipped device for inter-connecting any first type unit with the second type unit by radio link, wherein each inter-connecting device incorporates a processor and a configuration memory and different identifiers are stored in the memories of the respective inter-connecting devices of the first type units, whilst a record of these identifiers is stored in the second type unit.

- 8 -

Generally, the first type units will be computers, and the second type unit will be printers or other hard copy devices.

The invention thus provides the advantage of inter-connection between several computers and a single peripheral unit such as a printer by means of radio links, whilst retaining the facility for switching and/or selection offered by physical connector leads and, due to the presence of the identifiers, without risk of interaction with any other computers or peripheral units on the premises, which would be allotted different identifiers.

Description of embodiment

The invention is exemplified in the following description, making reference to the accompanying drawings, in which:-

Figure 1 diagrammatically shows a personal computer linked by radio to a peripheral unit by means of a pair of plug-in inter-connecting devices;

Figure 2 is a block circuit diagram appertaining to either one of the inter-connecting devices;

Figure 3 is a second block diagram;

Figure 4 is a second block diagram; and

Figure 5 shows a modification.

Referring to the drawings, a personal computer 10 has a general purpose interface port, serial bi-directional or parallel output, into which is plugged an inter-connecting

- 9 -

device 12.

The device 12 comprises a housing 14 resembling that of a Canon-D type fitting, but is slightly longer in the direction normal to the plane of the interface. In addition to a connector plug 16 which engages into the computer interface port in the conventional manner, the housing 14 accommodates a printed circuit board carrying a processor and associated configuration memory 18, an interface input/output circuit 20 with associated serial output/parallel output selection switch 22, a data packetisation and error handling circuit 24, a channel set-up and data flow control circuit 26, a short range radio transceiver circuit 28 of the FDMA type and an antenna 30.

A peripheral unit such as a printer 32, also equipped with a serial bi-directional or parallel input interface port, has plugged into it a similar inter-connecting device 12.

Each device 12 derives the power it requires for operation from the computer or peripheral unit into which it is plugged.

When data transmission is called for, usually by the computer 10, a radio link is established with the peripheral unit 32 via the two radio transceivers 28 and the data is transmitted by so-called "ping-pong" transfer, in blocks with added checksums.

Referring specifically to Figure 3, the computer 10 and the printer 32 are indicated, together with the configuration memory 18 of the inter-connecting device 12 of each said unit.

- 10 -

By use of the computer 10, a unique identifier in the form of a serial number is programmed into the memories 18 of the inter-connecting devices 12 of the two units 10, 32. The serial number may comprise an allocated part and a randomly generated part, to maximise security.

When a radio link is to be initiated, the identifier, the same in the inter-connecting device of each unit 10, 32, is used to ensure that the link can only be established and data transferred between the said two units 10, 32. Other computers and peripheral units present on the premises and also provided with interconnecting units such as 12, are excluded because the memories of inter-connecting devices of these other units contain different identifiers.

Referring to Figure 4, a printer 32 and a plurality of computers 10A, 10B, 10C are indicated, together with the processor and configuration memory 18 of the inter-connecting device 12 plugged into each said unit.

By use of a computer, a unique identifier in the form of a serial number such as 57 (in the case of 10A) is programmed into the configuration memories of the inter-connecting devices of each computer 10A, 10B, 10C, ie one different identifier for each computer, whilst a record of all these identifiers (57, 83 and 24) is programmed into the configuration memory 18 of the inter-connecting device plugged into the printer.

The identifier (57, 83, 24) enable the printer 32 and computers 10A, 10B, 10C to operate as a group, but without risk of radio links between any one of the computers and

- 11 -

the printer having any inter-action with other computers or peripheral units on the premises, if these latter are allocated different serial numbers.

The configuration memory of the printer inter-connecting device also holds details of the characteristics of the printer interface port, ie serial/parallel type and data rate, the device being fitted with a Centronics or Canon-D type fitting plugged into said port.

Only one document may be printed at once and it is to be expected that a document will be printed completely in one printing session. Personal computers normally supply all data to be printed in one burst, unless inhibited from doing so by the printer sending a "busy" signal.

Therefore, the printer unit monitors for computers wishing to send data and when one does so allows it to claim the printer. The printer is then allocated to that computer until it sends no further data for a fixed period, ie a timeout period. At this point another computer may claim the printer on the same basis. Preference may be given to competing computers on a "round robin" basis, ie by keeping a time-ordered list of the identifiers of computers which used the printer and allocating use to the computer which least recently used it.

Referring back to Figure 2, the manner in which the above is implemented may be as follows. The printer unit never initiates connections. It is able to monitor all forty channels of a CT2 radio system for call set-up requests for any one of its stored identifiers; at the same time it can be receiving data on one channel only. For this purpose, the inter-connecting device contains two independent receiver/transmitter systems. On the

- 12 -

monitoring channel the printer can return a busy signal when appropriate which the inter-connecting device at the computer relays to the computer itself. The order in which computers have tried to connect may be stored in the printer unit as a basis for ordering acceptance of these connections after the current connection is cleared down, or the above-described "round robin" approach may be used.

An alternative method of implementing a printer unit inter-connecting device is shown in Figure 5. The radio receiver, channel control, error handling and (de)packetisation are all implemented in several independent parallel systems. This allows more than one radio connection to be in progress at once. Since only one connection can actually access the printer at once, the unit therefore has an amount of semiconductor memory (RAM) available to receive printable documents while the printer is busy. Conflict between users is therefore resolved by the "spooling control" rather than by channel connect request rejection, as previously provided. The selection of a document to be printed will be ordered as previously described for access selection.

Data transfer over radio links may be refused or suspended when the RAM is full. The approach indicated by Figure 4 is likely to be of use in systems where the sending computer is unable to proceed with other tasks until it has transmitted everything to the printer. Otherwise the first approach is more suitable.

Since data flows almost exclusively from computer to printer, the ping-pong channel sharing mechanism may be arranged such that nearly all the data channel space is

- 13 -

allocated in one direction. For a printer which can accept data continuously at high speed, eg a laser printer, this may improve throughput and hence printer utilisation by a factor of nearly two. It also enables the duration of the radio connection to be reduced.

In Figure 4, the same references as in Figure 2 are employed for similar blocks. However, the spooling control is indicated by reference 34 and the associated RAM for data storage by reference 36.

CLAIMS

1. A method of setting up a data processing system consisting of a plurality of computer units and computer peripheral units characterised by the step of fitting a radio transceiver device to each of said units for inter-connecting one unit with another by a radio link characterised in that each inter-connecting device incorporates a processor and a configuration memory and an identifier is stored in each memory so that only units having the same identifier can communicate with one another.
2. A method as claimed in claim 1, characterised in that the identifier consists of two parts, namely a serial number unique to a pair of inter-connection devices followed by a random generated number.
3. A method as claimed in claim 1, characterised in that in the case of an inter-connecting device for a printer or analogous peripheral unit, the identifier is programmed into the configuration memory using a computer, and after programming the device is removed from the computer and transferred to the peripheral unit in question.
4. A method as claimed in claim 3, characterised in that the identifier is transferred from the computer to the inter-connecting device memory using an escape sequence of data which is a sequence of data not normally transferred by radio to another inter-connecting device, but is a

- 15 -

sequence of data which an interface input/output circuit in the inter-connecting device is adapted to recognise as an instruction to the processor in the device, to set up or alter the contents of the configuration memory.

5. A method of setting up a data processing system comprising plural units of a first type computers and a single unit of a second type (a computer peripheral unit), each unit being fitted with radio transceiver device for inter-connecting any first type unit with a second type unit by radio link, characterised in that each inter-connecting device incorporates a processor and a configuration memory, different identifiers are stored in the memories of the respective inter-connecting devices for the first type units, and a record of each of these identifiers is stored in the memory of the second type unit to identify and authorise communication channels to units of the first type.

6. A method as claimed in claim 5, characterised in that the second type unit, when not already radio linked, is adapted to continually monitor the first type units for a claimant for inter-connection, whereupon a radio link with the claimant is established if a claimant is found, data is transferred on the established radio link, and the radio link is broken only when transmission of data has ceased for a predetermined time-out period.

7. A data processing system comprising a plurality of units consisting of computers and peripheral units each characterised by radio transceiver device for inter-connecting one unit with another by radio link each inter-connecting device having a processor and a configuration memory in which is stored an identifier which will permit

- 16 -

a unit into which are said inter-connecting device is incorporated, to communicate only with a unit into which is incorporated another inter-connecting device having the same identifier stored in its configuration memory.

8. A system as claimed in claim 7, wherein the units have interface ports characterised in that the radio-transceiver inter-connecting devices are plugged into the interface ports in place of the usual plugs and interconnecting cables.

9. A system having plural units of a first type computers and a single unit (a computer peripheral) of a second type, characterised in that radio transceiver devices for inter-connecting any first type unit with the second type unit by radio link, are incorporated into the said units and each inter-connecting device incorporates a processor and configuration memory and different identifiers are stored in the memories of the respective inter-connecting devices of the first type units whilst a record of these identifiers is stored in the second type unit.

10. A system as claimed in claim 9, wherein the second type unit when not radio linked continually monitors the first type units for a claimant for inter-connection.

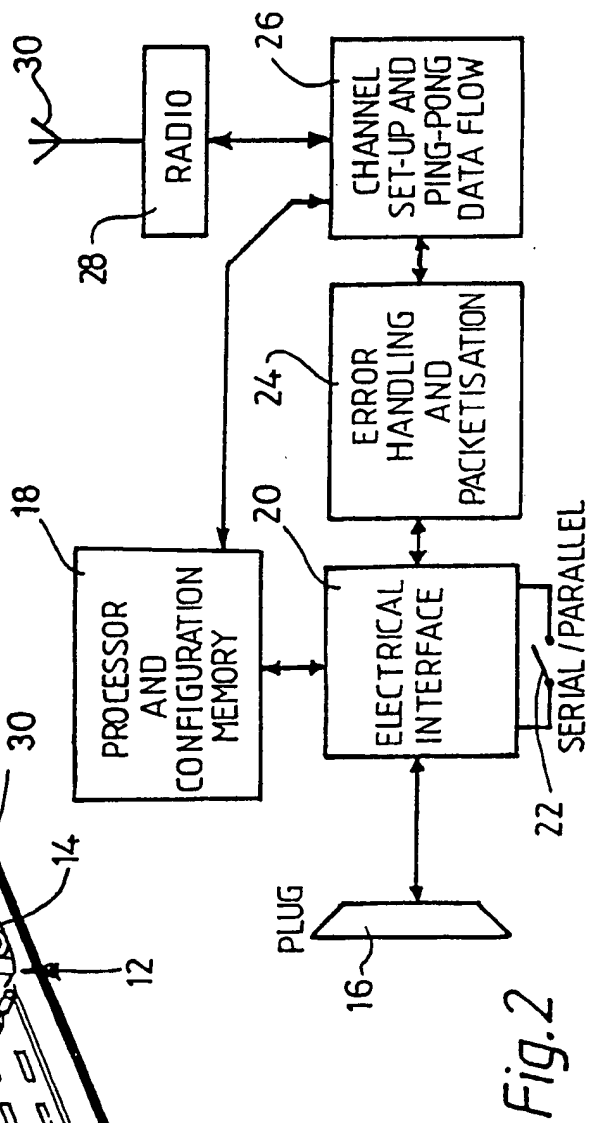
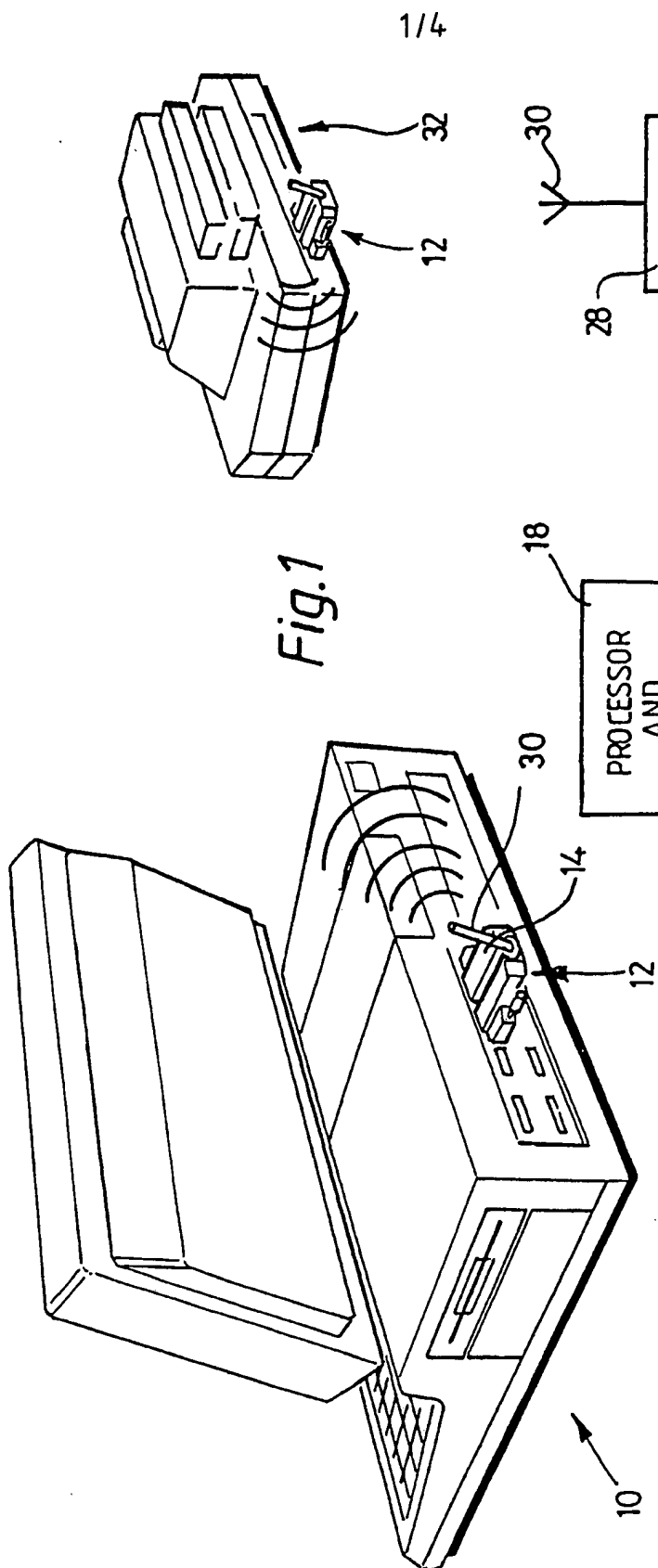
11. A computer system as claimed in claim 9, wherein the inter-connecting device of the second type unit incorporates multiple receiver channels and a memory means available to store the data, thus allowing more than one radio link to be established at the same time, the second type unit operating by sequentially accessing the data stored in the memory means of its inter-connecting unit.

- 17 -

12. A system as claimed in claim 9, wherein the units have interface ports characterised in that the radio-transceiver inter-connecting devices are plugged into the interface ports in place of the usual plugs and interconnecting cables.

13. A method of setting up a plurality of computers and peripheral units substantially as herein described with reference to and as illustrated in the accompanying drawings.

14. A data processing system comprising a plurality of units consisting of computers and peripheral units constructed and arranged to operate substantially as herein described with reference to and as illustrated in the accompanying drawings.



2/4

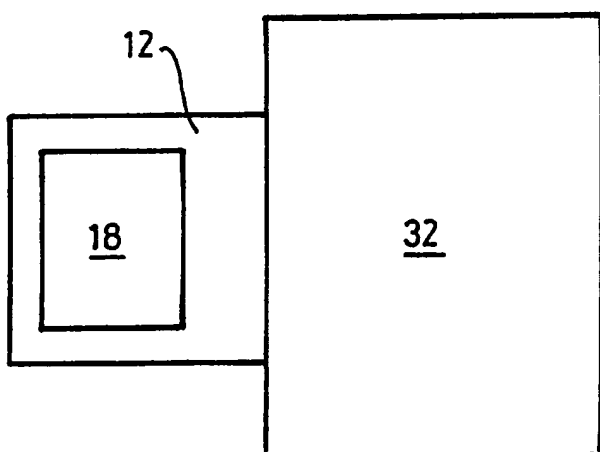
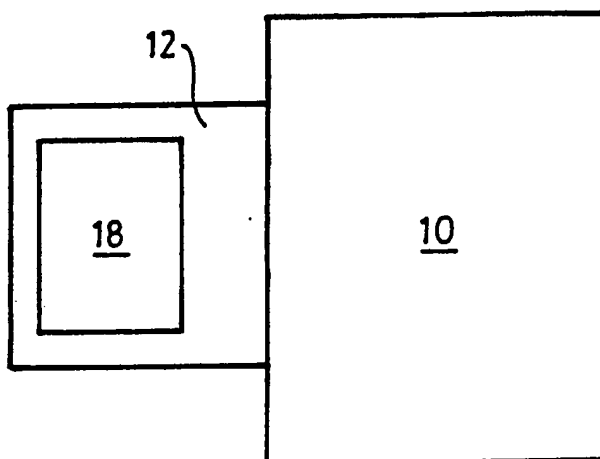


Fig. 3

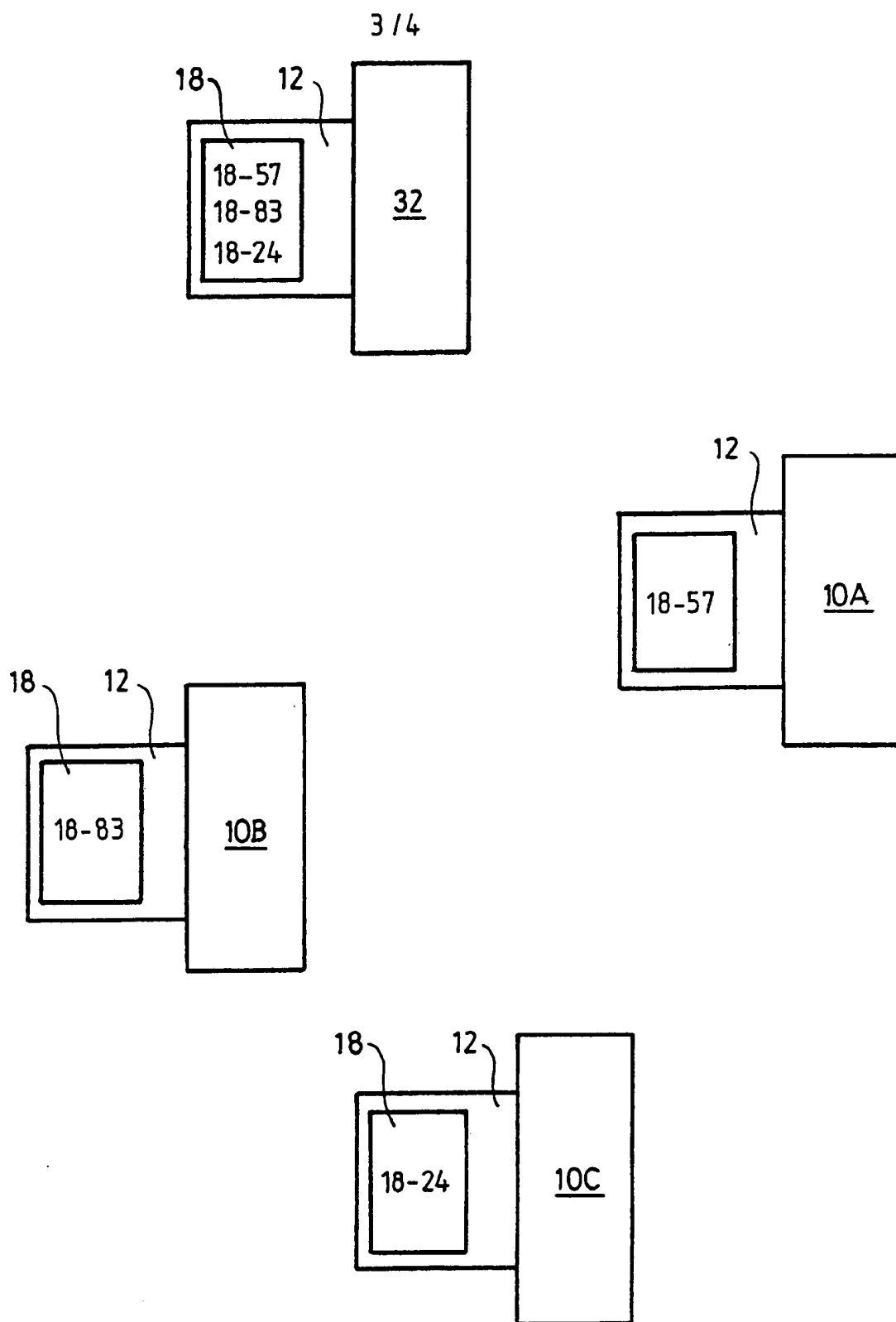


Fig. 4

4 / 4

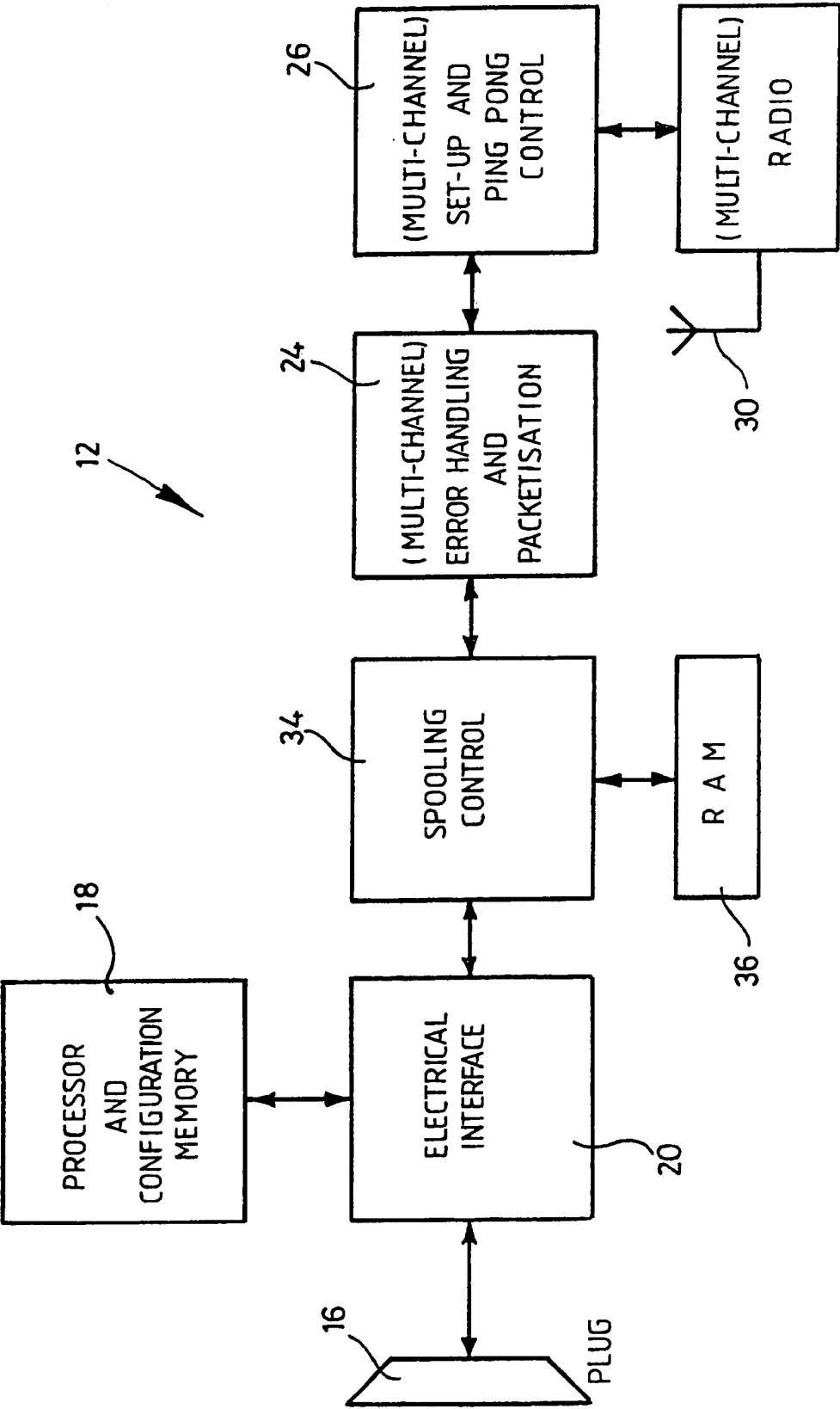


Fig. 5

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 90/00653

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC ⁵ : G 06 F 13/40		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC ⁵	G 06 F 13/40, H 04 M 1/72	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	US, A, 4247908 (LOCKHART, Jr. et al.) 27 January 1981 see column 2, line 52 - column 3, line 11; column 3, line 53 - column 4, line 8; figure 10	1,5,7,9,13, 14
A	--	3
Y	EP, A, 0164312 (AUTOPHON A.G.) 11 December 1985 see page 2, lines 9-15; page 3, lines 21-24; page 6, lines 16-23	1,5,7,9,13, 14
A	--	3,4,6,8, 10-12
A	Patent Abstracts of Japan, vol. 9, no. 133 (P-362)(1856), 8 June 1985, & JP, A, 6015766 (HANAZONO DENSHI	1-14
<p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
28th June 1990	24.07.90	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	M. PEIS M. P23	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
	K.K.) 26 January 1985 --	
A	Patent Abstracts of Japan, vol. 10, no. 271(P-497)(2327), 16 September 1986, & JP, A, 6194165 (TOMU SHOJI K.K.) 13 May 1986 --	1-14
A	Electronics International, vol. 56, no. 11, 25 August 1983, J. Krebs: "Portable computer and host talk over radio-frequency link", pages 142-145 -----	

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.

GB 9000653

SA 36552

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on 16/07/90
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4247908	27-01-81	CA-A- 1131316	07-09-82
EP-A- 0164312	11-12-85	None	

EPO FORM P0479

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82